

Having described the invention, what is claimed is:

- 1 1. In a bolt-together trailer frame having a plurality of frame members bolted together,
2 wherein the improvement comprises:
 - 3 at least two axle frame members, each axle frame member having at least one axle
4 cut-out in a lower portion thereof;
 - 5 at least one cut-out reinforcing member proximate the at least one axle cut-out; and
 - 6 at least one axle member, the at least one axle member comprising one of: at least
7 one torsion axle integral with two cut-out reinforcing members; and at least one sprung axle
8 unit,
 - 9 each sprung axle unit comprising: a plurality of spring hangers attached to the at
10 least one axle frame member; leaf springs attached to the spring hangers; and an axle
11 attached to the leaf springs.
- 12 2. The improvement according to claim 1, wherein the at least one axle member is a
13 sprung axle unit, the number of sprung axle units is two, the number of axle cut-outs is four,
14 the leaf springs comprise four sets of leaf springs, and the spring hangers comprise four
15 end spring hangers and two pivotable equalizer spring hangers, each set of leaf springs
16 being attached to one end spring hanger and one pivotable equalizer spring hanger, a
pivotable equalizer spring hanger being positioned between two end spring hangers.
- 17 3. The improvement according to claim 2, wherein the number of axle frame members
18 is four, two axle frame members being bolted to one another, and further comprising: at
19 least one connector reinforcing member attached to each of the two bolted together axle
20 frame members,
 - 21 each pivotable equalizer being attached to one of the at least one connector
22 reinforcing members.

4. The improvement according to claim 1, further comprising:
a plurality of cross supports attached to and extending laterally from the at least two axle frame members.
5. The improvement according to claim 4, wherein the laterally extending cross supports extend to and are attached to a corresponding laterally spaced axle frame member.
6. The improvement according to claim 4, wherein the laterally extending cross supports extend part way towards a corresponding laterally spaced axle frame member.
7. The improvement according to claim 6, wherein the laterally extending cross supports are adapted to be connected to a floor.
8. The improvement according to claim 1, wherein the at least one axle member is a torsion axle, the number of axle cut-outs is four and the number of torsion axles is two.
9. The improvement according to claim 1, wherein the number of axle frame members is four, two axle frame members being bolted to one another, and further comprising: at least one connector reinforcing member attached to each of the two bolted together axle frame members.
10. The improvement according to claim 9, wherein the number of connector reinforcing members being attached to each of the two bolted together axle frame members is two, one of the at least one connector reinforcing members being attached to an outside surface of the bolted together axle frame members and one of the at least one connector reinforcing members being attached to an inside surface of the bolted together axle frame members.

11. The improvement according to claim 1, wherein the at least one axle member is a sprung axle unit and, further comprising: a spring hanger reinforcement gusset attached to the axle frame member between the axle frame member and the spring hanger.
12. The improvement according to claim 1, further comprising:
a laterally extending flange about at least a portion of the axle cut-out.
13. The improvement according to claim 12, wherein the axle cut-out includes a top portion distal a lower edge of the axle frame member, the laterally extending flange being positioned about the top portion.
14. The improvement according to claim 1, wherein the axle frame member includes a plurality of dimples about the axle cut-out and the cut-out reinforcing member includes a corresponding plurality of dimples, the axle frame member dimples being in nested engagement with the cut-out reinforcing member dimples.
15. The improvement according to claim 14, wherein at least one of the cut-out reinforcing member dimples has an aperture therethrough and at least one of the axle frame member dimples has an aperture therethrough; and, further comprising:
a threaded fastener extending through the apertures fastening the axle frame member and the cut-out reinforcing member together.
16. The improvement according to claim 1, wherein the cut-out reinforcing member is a plate positioned about the at least one axle cut-out.
17. The improvement according to claim 16, wherein the plate has a cut-out corresponding to the axle cut-out.

18. The improvement according to claim 1, wherein the cut-out reinforcing member is a longitudinally extending stiffener plate attached to the axle frame member.

1 19. In a bolt-together trailer frame having a plurality of frame members bolted together,
2 wherein the improvement comprises:

3 at least two axle frame members, each axle frame member having at least one axle
4 cut-out in a lower portion thereof, a laterally extending flange about at least a portion of the
5 axle cut-out, a plurality of through apertures about the axle cut-out, a dimple positioned
6 about at least one of the through apertures;

7 at least one cut-out reinforcing member about the at least one axle cut-out and
8 fastened to an axle frame member, the cut-out reinforcing member having a plurality of
9 apertures therein and a dimple positioned about at least one of the axle cut-out apertures,
10 the cut-out reinforcing member dimples being in nested engagement with the axle cut-out
11 dimples; and

12 at least one axle member attached to the axle frame members.

20. The improvement according to claim 19, wherein the at least one axle member is at least one torsion axle, each torsion axle being integral with two cut-out reinforcing members.

21. The improvement according to claim 20, wherein each torsion axle is welded to the two cut-out reinforcing members.

22. The improvement according to claim 19, wherein the at least one axle member is at least one sprung axle unit, each sprung axle unit comprising: a plurality of spring hangers attached to the at least one axle frame member; leaf springs attached to the spring hangers; and an axle attached to the leaf springs.

1 23. A method of assembling a bolt-together trailer frame comprising:
2 providing a plurality of frame members including at least two axle frame members,
3 each axle frame member having at least one axle cut-out therein;
4 selecting at least one axle member to fit the intended use of the bolt-together trailer
5 frame, the selection being one of: a torsion axle and a sprung axle;
6 fastening the plurality of frame members together with a plurality of threaded
7 connectors;
8 fastening an axle cut-out reinforcing member about each axle cut-out; and
9 attaching at least one axle member to the axle frame members.

1 24. The method according to claim 23, wherein the at least one axle member is a torsion
2 axle; and further comprising:
3 welding the torsion axle to the axle cut-out reinforcing member.

1 25. The method according to claim 23, wherein the at least one axle member is a sprung
2 axle unit comprising: a plurality of spring hangers, leaf springs and an axle and further
3 comprising:
4 attaching the spring hangers to the axle frame members;
5 attaching the leaf springs to the spring hangers; and
6 attaching the axle to the leaf springs.

26. The method according to claim 25, further comprising:
3 fastening a plurality of transversally extending cross-support members with threaded
4 connectors to the axle frame members.

1 27. The method according to claim 23, wherein the axle member has a plurality of
2 dimples therein and the cut-out reinforcing member has a plurality dimples therein, and
3 further comprising:

4 prior to the step of attaching the cut-out reinforcing member to the axle member,
5 nesting the cut-out reinforcing member dimples and the axle member dimples together.

1 28. The method according to claim 23, further comprising:

2 providing an external reinforcing connector;

3 providing an internal reinforcing connector;

4 positioning two axle frame members end to end;

5 positioning the external reinforcing connector across the ends of both axle frame
6 members on an external surface of the axle frame members;

7 positioning the internal reinforcing connector across the ends of both axle frame
8 members on an internal surface of the axle frame members; and

9 fastening the external reinforcing connector, the internal reinforcing connector and
10 the two axle frame members together with threaded fasteners.

1 29. A bolt-together trailer frame comprising:

2 a plurality of frame members connected together by a plurality of threaded fasteners
3 to form a trailer frame,

4 the plurality of frame members including at least two axle frame members adapted to
5 be connected to either a torsion axle or a sprung axle.

1 30. The bolt-together trailer frame according to claim 29, wherein the adaptation of the
2 at least one axle frame member includes each axle frame having at least one axle cut-out
3 therein; and at least one cut-out reinforcing member about the at least one axle cut-out, the
4 cut-out reinforcing member being threadedly connected to the axle frame member.

31. The bolt-together trailer frame according to claim 30, wherein the adaptation of the at least one axle frame members further includes a laterally inwardly extending flange about at least a portion of the axle cut-out.
32. The bolt-together trailer frame according to claim 30, wherein the cut-out reinforcing member is a plate positioned about the at least one axle cut-out.
33. The bolt-together trailer frame according to claim 32, wherein the plate has a cut-out corresponding to the axle cut-out.
34. The bolt-together trailer frame according to claim 30, wherein the cut-out reinforcing plate is a longitudinally extending stiffener plate attached to the axle frame member.
35. In a bolt-together trailer frame having a plurality of frame members bolted together, wherein the improvement comprises:
 - 1 at least two axle frame members, each axle frame member having at least one axle cut-out in a lower portion thereof;
 - 2 at least one cut-out reinforcing member attached to each axle frame member with threaded fasteners about the at least one axle cut-out; and
 - 3 at least one axle member attached to the at least two axle frame members with threaded fasteners.
36. The improvement according to claim 35, wherein the at least one axle member is a torsion axle integral with two cut-out reinforcing members.
37. The improvement according to claim 35, wherein the at least one axle member is a sprung axle unit, the sprung axle unit comprising: a plurality of spring hangers attached to

the at least one axle frame member; leaf springs attached to the spring hangers; and an axle attached to the leaf springs.

1 38. A bolt-together trailer frame comprising:

2 a plurality of frame members connected together by a plurality of threaded fasteners
3 to form a trailer frame, the plurality of frame members including at least two axle frame
4 members, each axle frame member having at least one axle cut-out in a lower portion
5 thereof;

6 a sprung axle support box connected to the at least two axle frame members, the
7 sprung axle support box comprising: each axle frame member having a longitudinally
8 extending stiffener plate attached thereto proximate the at least one axle cut-out; and two
9 cross members connectedly attached to at least one axle frame member, each cross
10 member being attached proximate an end of a stiffener plate;

11 a plurality of spring hangers fixedly attached to the sprung axle support box; and

12 at least one sprung axle unit attached to the spring hangers, each sprung axle unit
13 comprising: two sets of leaf springs, the leaf springs being attached to the spring hangers;
14 and an axle attached to the leaf springs,

15 the axle frame members and the sprung axle support box cross members being
16 connected by fasteners.

39. The bolt-together trailer frame according to claim 38, wherein each stiffener plate is
welded to an axle frame member.

40. The bolt-together trailer frame according to claim 38, wherein the axle frame
members have a vertically extending side portion and a top portion extending at a 90°
angle away from a top edge of the side portion.

1 41. The bolt-together trailer frame according to claim 40, wherein the stiffener plates
2 have a vertically extending side portion and top and bottom portions extending at a 90°
3 angle away from top and bottom edges of the side portion, the top and bottom portions
4 extending in the same direction whereby the top, bottom and side portions form a C shape,
5 the stiffener plate top and bottom portions extending towards the side member side portion
6 thereby forming an enclosed space having top, bottom and two sides.

42 The bolt-together trailer frame according to claim 41, wherein the vertical height of
the side member side portion is greater than the vertical height of the stiffener plate side
portion.

43. The bolt-together trailer frame according to claim 41, wherein the spring hangers are
attached to the stiffener plate bottom portion.